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ABSTRACT

Conference papers on scholarship at a land-grant university, scholarship in general, and the interrelationships among scholarship, teaching, research, and societal needs are presented. In "Scholarship Through Teaching," Keith Goldhammer suggests that teaching, research, and scholarship are not separate domains, and that the teacher's role is to help students see the value of the accumulated knowledge of the past, to exercise reason in understanding and resolving problems, and to seek new knowledge and better syntheses and interpretations of knowledge. In "Scholarship and Society," Norman Graebner suggests that there is a need for new moral and intellectual leadership to strengthen the academic profession and to make it more useful to society. The need for greater effort within the academic community to improve the relationship between teaching and research, both in the sciences and in the humanities, is noted. In "Scholarship Through Research," Ronald St. Pierre projects that research will change in the coming years from influences such as funding and federal regulations and that there will be increased demand for a more rapid solution to pressing social problems such as health concerns. A historic view of some research activities is also presented. In "Scholarship," Joab Thomas addresses the general subject of the impact of scholarship on land-grant universities and considers opportunities for scholarship in the 1980s. The need to improve the academic reputation of land-grant universities, and to avoid too narrow a focus is suggested. (SW)

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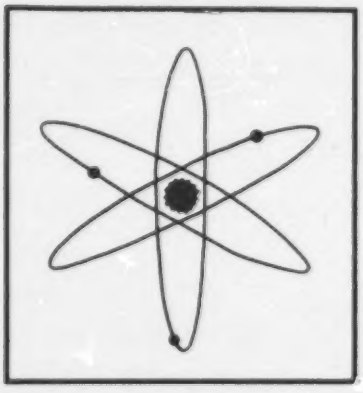

Scholarship at a Land-Grant University

Mississippi State University
Monday, October 20, 1980

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FOREWORD

If one agrees with Webster that scholarship is associated with the qualities of learning, then the topic should be discussed on a regular basis through the university community. Our group of distinguished professors planned an outstanding program which focused on scholarship and was presented by nationally known speakers. The lectures given by our guests are presented in this publication.

The conference should set the tone for those which follow. A major goal of this initial lecture series was to stress that scholarship is multi rather than unidimensional. An additional aim of the conference was to stress that when the major purposes of the university are pursued in an appropriate manner, the ultimate goal should be for them to complement rather than compete with each other.

We are grateful for the planning done by the distinguished professors, the leadership provided by professors Bruce Glick, James Yarbrough, and Ben Byler, and all who participated. Finally, we are most appreciative for the contributions made by the scholars who presented this first series of lectures.

James D. McComas

James D. McComas
President, Mississippi State University

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KEITH GOLDHAMMER, Professor of Administration and Higher Education at Michigan State University, received his Ph.D. in educational administration and sociology of education from the University of Oregon. He has served as teacher, principal, and superintendent in the school systems of Idaho and Oregon. He taught at the University of Oregon from 1956-67, served as associate dean and dean of the School of Education, Oregon State University, from 1965-72, and was dean of the College of Education at Michigan State University from 1972-80. His research interests include evaluation of the Arkansas Experiment in Teacher Education, study of public elementary and secondary education in Oregon, and group influences and issues in educational decision-making at the local community level. He has also served as consultant and director of research and surveys for various school districts in Oregon, California, Arizona, Nevada, Idaho and Nebraska.

Scholarship Through Teaching

What would the modern world be like if Darwin, Marx, Freud, Dewey and Einstein had not lived? These five men, each in his own way, made fundamental contributions to our culture and to the quality of our lives through their scholarship and humanism.

Darwin carefully classified his specimens, compared, catalogued, tested and synthesized his data. His findings opened new vistas in biological and social concepts of change, questioned previously untouchable concepts, and opened new opportunities in the human urge to know. Darwin's work may not have met the research standards of modern science, but it laid the foundation for it.

Dewey looked at the basis presuppositions upon which society and individuals interact, and from his observations and reflections he synthesized new perspectives about human affairs. His philosophy about society and education, in particular, laid the foundations for liberal, democratic governance in the modern world.

Marx felt that the careful study of history would reveal to him the inexorable laws of social evolution, so he could predict, plan for, and control the future. Although our conception of communism today has changed and Marx would be appalled at the crimes committed in his name, most of the planks of his *Communist Manifesto* have been realized by the contemporary blend of the capitalistic-welfare state.

Freud identified some of the sources of pathologies of the mind and personality, but the brilliance of his investigations and the clear definition of the phenomena with which we should be concerned paved the way for humane care of those who have severe emotional problems as well as the professional treatment of mental and personality disorders.

Einstein, with his slow, torturous, careful analysis, laid the foundation for the resolution of some of the anomalies which plagued the scientists of his day while more clearly opening the avenues for contemporary scientific discoveries. Einstein was a philosopher and theoretical scientist more than a researcher, and probably his greatest contributions were the result of his teaching other scientists how to ask the right questions about the physical universe.

All of these men were scholars who sought to learn, to discover, to achieve understanding, to teach, to resolve their doubts, to open new vistas of intellectual capability as well as professional service to mankind. Whatever hopes, dreams, aspirations they may have had for themselves, their attentions were riveted upon their intellectual endeavors, and in the end, although unrelated (except that Marx, knowing Darwin's work, wanted to dedicate *Das Kapital* to him, but Darwin graciously declined), together they created the ethos of the modern world.

It will be the privilege of few scholars to achieve so much, but how many scholars, through their preparation of their students and the bits and pieces of knowledge and understanding they contributed, although known only through some obscure footnotes, contributed to the greatness of these giants?

The problem of "scholarship through teaching" centers around the issue of what the teacher tries to achieve by teaching. I recently participated in a discussion with a professor who used the term, "professors and teachers." I jokingly suggested that this was tautological, to which she responded that the expectations of her university administrators called upon her to be a scholar, not a teacher. Perhaps that was an expression of the tragic dilemma of teaching in the modern American university.

There has been a long tradition of concern for the issue of what education is for. From Plato through the Greek philosophers, through the Renaissance, through people like Newman, the German philosophers, Locke, Rousseau, Whitehead, Dewey, Russell, in practically all instances, there was a concern about the pedantry of schools which taught merely to hear recitations and grade examinations rather than to instruct with some vision of that ultimate goal of teaching: to help students live a good, productive, contributing, meaningful and fulfilled existence. In many ways, the humanistic tradition on teaching was summarized by Spencer, even though, in his essay, "What Knowledge is Most Worth?," he thought he was building a new, scientific tradition in opposition to it:

> How to live? — that is the essential question for us. Not how to live in the mere material sense only, but in the widest sense. The general problem which comprehends every special problem is — the right ruling of conduct in all directions under all circumstances. In what way to treat the body; in what way to bring up a family; in what way to behave as a citizen; in what way to treat the mind; in what way to manage our affairs; in what way to utilise those sources of happiness which nature supplies — and how to use all of our faculties to the greatest advantage of ourselves and others — how to live completely? And this being the great thing needful for us to learn, is, by consequence, the great thing which education has to teach. To prepare us for complete living is the function which education has to discharge; and the only rational mode of judging of an educational course is, to judge in what degree it discharges such function.

Not until the Middle Ages, when thought control processes were invented, was the pursuit of knowledge conceived as an end-in-itself. The Greek ideal incorporated not only the good, the beautiful, and the true — all fairly safe to pursue — but the more hazardous search for the useful, as well. Prometheus was chained to the rock because he loved mankind and wanted it to be free, and Aeschylos recognized the value of knowledge in serving the human capacity to search for freedom and fulfillment.

In recent weeks the world was saddened to learn of the death of another great teacher, scholar, and

humanist, who contributed significantly to the understanding of how children develop intelligence as a part of their capability to cope with the problems of living. Jean Piaget has been reported in the media to have stated: "The goal of education is not to increase the amount of knowledge, but to create the possibilities for a child to invent and discover, to create men who are doing new things."

The primary tool through which the schools achieve their ends, as Piaget, Dewey, and Spencer well knew, was living knowledge — understanding which gave those who held it the power to survive and to gain fulfillment within the world. Human beings need to master and use their own essence as human beings effectively to accomplish their purposes. They need to cope with, control, and employ for their purposes the diverse environments of which they are a part. Through the processes of toiling, living, playing, coping, succeeding and failing among those environments, they build values, meanings, perspectives, ideals. Vast realms of knowledge are needed to help them achieve their authenticities as humans — and the task of the teacher, at any level, is to so structure the engagements of their students with the foundations of knowledge that they have them available for their employment to help them become effective, to achieve fulfillment, in their performance of their endeavors.

Unique as it is, the basic conception undergirding land-grant universities in the United States did not spring anew out of the American ethos. It was a part of a long tradition of pervasive rather than pedantic humanism. The new humanism saw the search for knowledge as the search for ways to better mankind. Jonathan Baldwin Turner, the man before all others to whom the land grant university is indebted, was a teacher of *belle-lettres* at Illinois College and a friend of President Lincoln, whom he helped to persuade to sign the Morrill Act. Turner's concern arose out of his observations that the masses were denied the opportunity to enjoy the benefits of knowledge of the historical, literary, philosophical and scientific traditions because of the intellectual elitism and snobbery within the American universities during the middle of the 19th century. The primary objective of the land grant university was to make those studies available to all who wanted to benefit from them, and to help the industrial, scientific, and mechanical arts profit from the insights provided from such studies, to enrich, enlighten, improve and free the human capacity for "effective living."

Turner, among other dedicated educators of his day, recognized that this new university, with different goals, tied into the humanistic tradition as classically defined, needed teachers of a different sort than predominated within the halls of European and American ivy. The scholar as recluse, disdaining and fearful of the world about him, and in retreat from the realities of human suffering and need, had no place in this educational plan. The new university was to be staffed by both scholars of the sophisticated disciplines who could apply scholarship to the marketplace of affairs and the skilled, knowledgeable, creative specialists in the applied professions, arts and vocations who were sufficiently acquainted with the contributions and concerns of the academic world that their knowledge made a difference in how they engaged both in teaching and application to their fields.

Erich Fromm has identified three basic tenets upon which the academic humanistic tradition is based. The first principle is, *Above all one must doubt (De ominbus est dubitandum).* The second, *I consider nothing human to be foreign to me (Nihil humanum a mihi alienum puto).* And the third is, *The truth shall make you free!* These principles — doubt, humanity, and search for truth — have been the cornerstones of teaching in the great land-grant tradition. Through stimulating students to doubt, one hopes to build their ability to challenge, to search, to find new and better ways to achieve the capacitation of students to help others live a fuller, richer, and more secure existence. Through this tradition, the land-grant universities have stimulated scholars and teachers in the agricultural sciences, for example, to find and teach people throughout the world how to better feed the masses, how to produce hybrids which maximize biological productivity under diverse soil and climatological conditions. They have taught people how better to utilize their resources so as to feed the hungry, relieve human suffering and overcome physical deficiencies. Because the University encouraged teachers who were scholars and researchers and who imparted the ability to doubt, to inquire, to search, to see, there are people throughout the world who have food who otherwise would not. There are children who are reared in wholesome homes and educated in effective schools who otherwise would not be. There are people who have access to adequate health services and who perform essential roles in their nations' developing economies, who otherwise would not. The scholarship in which professors engage and which they prepare students to continue and advance serves to assure those who support and those who accept our instruction that we can contribute to "effective living" through education.

But doubt can - and in academia sometimes does - degenerate into cynicism. How might such a tragic contamination of the educative process be avoided? The criterion used to direct "doubt" and to avoid despair, was that of humanity. The disciplines and professions were agents of human service. Turner hoped that the mechanic would be more than a manipulator of cogs, switches and wheels. He would be the philosopher-mechanic who knows his profession, but also understands its potentialities for serving humanity. If, as Muller stated, the history of Western civilization is of man's search for freedom, then, truly, the land-grant university marked a most significant redirection of academic endeavors to serve this end.

The two criteria which have served the land-grant university so well might not alone result in the full development of its capabilities. Service to mankind can be flaccid in the hands of "do-gooders" who may have the best of intentions but lack the knowledge and skill needed to achieve their desired ends. The third principle, the never ending search for truth, knowledge, understanding and skill - the persistent, careful evaluation and analysis of the "state of the art" has provided the substance for

teaching and development so essential to insure that what is taught and what is used to produce changes in the field are both accurate and responsible. Our constant subjection of what we teach, what we profess, either in the classroom or the community, to close scrutiny is the means for the assurance of our academic probity. The symbiotic relationships of teaching, research, and development have become the cornerstones of the land-grant universities and have enabled them to achieve pre-eminence among institutions of higher education.

The professors, administrators, and governing boards of universities must never be permitted to forget that their primary mission is teaching. The purpose of teaching is to prepare students to achieve their destinies as the persons ultimately responsible for the world of affairs. As they are educated, so will the world of the future become.

The craft of the teacher who would serve this end appropriately is founded in scholarship - the search for that knowledge which both raises and resolves doubt - the search for that knowledge which, as Dewey stated, will enable them to remove the indeterminancies in human affairs. The teacher is - and should be - servant to the educational needs and purposes of his students. This is sometimes very difficult for professors to accept. They frequently believe that *their* scholarship should serve *their* purposes even at the expense of their appropriate teaching of their students. It is also sometimes very difficult for University authorities to accept this fundamental principle, for scholarship which is consistent with the legitimate purposes of the university can be measured neither by the weight of the publications produced by the faculty nor by the frequency of appearance in refereed journals.

The legitimate scholarship of the university serves two significant ends. First, it is carefully devised to stimulate student growth toward the desired educational objectives. The professor who prepares teachers, be he in the disciplines or the professional school of education, must be a scholar of the needs of children and of teachers. His scholarship is directed toward his responsibilities for providing the best preparation for the real life of the teachers' world that can be developed. It is also designed to help improve the conditions of teaching in the pedagogical world. No one who disdains, avoids, or is ill prepared for such scholarship has a right to maintain such a position in higher education.

This is the second end which scholarship serves. The right of the university to usurp for its purposes a part of the income of the community exists only to the extent that it returns commensurate value to the community. It achieves this by sending back into the community students who are well prepared to deal with the living affairs of the community and by making available the fruits of its scholarship for all to enjoy and to use.

The teacher's role, then, is to so prepare himself that he can help students acquire a disposition to seek out and use the accumulated knowledge of the past, to exercise reason in the development of understanding and the resolution of problems, to seek new knowledge and better syntheses and interpretations of knowledge as the foundations upon which human judgements can be made.

Narrow pedantry suggests that teaching, research and scholarship are distinct and separate acts. This is only true if teaching is contrived into the meaningless process of assign-study-recite-test for obtaining credit or grade. But, if teaching is truly the building of inquiring minds, where the end is the growth and capacitation of the student for both effective personal living and a contributing social existence, then teaching truly becomes an act of scholarship and of love. Out of the thousands we teach will emerge the few who like Darwin, Dewey, Freud, Marx and Einstein become the architects of the future ethos of the world. Let us hope they will have been taught to maintain that constant search for better understanding within the humanistic tradition.

NORMAN GRAEBNER has held the Edward R. Stettinius Professorship in modern American history at the University of Virginia, Charlottesville, since September 1967. His Ph.D. is in history from the University of Chicago. During his academic career he has taught at Iowa State University, Stanford University, and at the University of Illinois, and has presented lecture series at the University of London and several U. S. universities. He has also served as Fulbright Lecturer at the University of Queensland, Brisbane, Australia. In 1975-76 he was Distinguished Visiting Professor of History at Pennsylvania State University and directed that university's bicentennial program. For 1978-79 he was designated the Harold Vyvyan Harmsworth Professor of American history at Oxford University. He is the editor or author/co-author of 16 books, the most recent being *The Age of Global Power* (1979). His other writings on American politics and foreign policy include some hundred articles and portions of books. His chief interest is American foreign policy, which he teaches at the University of Virginia.

Scholarship and Society

Few Americans would deny that there should be some relationship between the excellence of an educational system and the quality of a country's economic, political, and social structure. If education makes no measurable improvement in the sensitivity, awareness, and analytical capacity of the public in matters of general welfare, then it does little more than serve the narrow interests of those engaged in it and fill the necessary positions in business and government. Never in history has a society spent money in such profusion for its educational betterment as has the United States during the past two decades. How that educational system has served the needs of the nation is a legitimate subject for critical examination.

Motivated by the fear, unleashed by Sputnik, that the United States might become second-best in scientific and technological achievement, the nation began, in the late fifties, to expand its educational structure far beyond any precedent in history. The expenditure, stimulated as well by the promises of endless employment for the educated in an expanding and increasingly sophisticated economy, and by legislatures well attuned to the public and institutional demands for ever-larger educational appropriations, soon had no visible limits. Higher education in the 1960s became one of the country's leading growth factors. Caught up in a momentum which responded to unprecedented public and private funding, many of the country's colleges and universities quickly doubled and trebled in size. By the mid-sixties the educational system had become frightfully expensive. Whether the effort served any national requirement was always doubtful. University administrators seldom acknowledged any need for growth except that of qualifying for the burgeoning state and federal appropriations. John W. Oswald recalled the golden years of higher education—the first half of the sixties when he was president of the University of Kentucky—in these words:

> Funding from state and federal and private sources was never higher or more easily achieved. Following Sputnik, there had developed an appreciation of what research could accomplish—and of course the universities were doing a large part of that research. Never were there higher expectations for universities or more willingness on the part of the public to support these expectations.
>
> A president's job then was mostly to try to keep buildings going up fast enough and programs sound enough to stay even with the influx of students and monies. And there was an opportunity to do certain things quite different and new and important to universities.
>
> Looking back, I think perhaps we oversold the universities, but at the time we sincerely thought that we might be able to do for the cities and the urban crisis what we had done for agriculture.

Unfortunately there was little relationship between educational expenditure and academic relevance. Much of the specialized university research, conducted at enormous expense to society, returned little useful knowledge to the community. Growth served the interests of the larger faculties, even more the huge educational bureaucracies. It created a large body of academic entrepreneurs whose loyalties were to their disciplines and not to their institutions; to travel, research, and consulting, not to students or teaching. The new forms of academic enterprise were often, if not generally, reflected in lighter teaching loads. Faculties, with their wider opportunities for personal advancement, did not improve the education of undergraduates. They created, instead, a disturbing conflict between the university's teaching and research functions. What aggravated the neglect of undergraduate education was the decision of many university administrators to reserve their special rewards for specialized education and research rather than for those who demonstrated a capacity and determination to put their learning to us in their classrooms.[1]

II

What contributions the American system of higher education has made to the quality of the nation's economic and political performance, two essential measures of national success, are elusive. Any examination of the country's record during the past twenty years forces one to look in vain for the growth in public and private wisdom, especially as it affects the wellbeing of the country, which one might expect of its massive educational effort. The major premise of academic-born liberal economics has been the assumption that the large modern corporations had escaped the rigors of competition and no longer operated within the limits set by supply and demand. Having solved or eliminated the traditional hazards that once plagued business, the modern corporations, by conquering the problems of production, appeared invulnerable to the destructive forces of history. The future of the economy seemed assured. Advertising and persuasion would guarantee a steady market even for products that people did not need and often did not want. Corporate enterprise promised a bountiful world with plenty to satisfy the needs of a booming consumer economy. What remained for the nation was the harnessing of the vast productive power of the large corporations to assure their proper social functions.[2]

Ostensibly this country after mid-century entered an age of economic marvels with a superabundance of attractive goods and ample purchasing power creating a standard of living such as the world had never seen. Somehow from the beginning economists, no less than public and business leaders, overlooked the fact that what sustained the prosperity was less the balance within the economy than the growth of public and private indebtedness to levels that would defy repayment. Debts of $4 trillion, accumulated over a brief span of 30 years, will

buy a great deal of prosperity under any conditions. Indeed, without a limitless increase in the nation's debt structure and a corresponding inflation, the economy seemed incapable of performing at all. What fed the indebtedness was the widespread personal compulsion to maintain standards of living created by a quarter century of artificially-stimulated prosperity. If millions of Americans could not achieve material well-being amid such economic stimulants, it is not clear what levels of business and credit expansion would enable them to do so.[3]

Nor could the prosperity defend the country against the poor decisions of industry. Too often business leaders, avoiding price competition as they divided huge, established markets, failed to serve their own or the country's interests. Momentum in the automobile industry, anchored to previous investments, available technology, anticipated profits, and carefully contrived consumer demand, carried production to 10 million automobiles a year. The number of cars in the United States increased five times as rapidly as the population, reaching 1.4 cars per family in the 1960s. Automobiles became increasingly larger, more powerful, and more expensive. In 1965 the Ford Galaxy, with its small engine, weighed approximately 3500 pounds, as did the Chevrolet Impala. Soon, both automobiles with more powerful engines would gain 1000 pounds in weight, while Cadillacs and Lincolns would eventually come to exceed 5000 pounds. Whether these changes answered any national need remained immaterial; they demonstrated that large automobiles could be sold at a greater profit than could small ones. No one ever determined how many or what kind of automobiles the country required to meet its transportation requirements.

With no external or internal judgment to guide it, Detroit made the wrong cars years after the soaring price of gasoline demonstrated the need for smaller, fuel-efficient, automobiles. It is true that the public continued to buy the larger automobiles long after the auto makers placed smaller cars on the market. The public's behavior continued to reflect personal preferences for status, comfort, and speed largely because neither government nor industry placed the real issue before the American people—that the supply of gasoline was not unlimited and that small automobiles would serve the country's long-term interests better than large ones. Indeed, the government in 1975 and 1976 promised the nation's citizens that there would be no more gasoline shortages; with such assurances it inaugurated the greatest orgy of energy consumption in history. It was the illusion of cheap gasoline, sustained far too long, that hurt the automobile industry. Those who wanted good small cars bought foreign models. Eventually the price of gasoline, and the increasing percentage of the domestic automobile market going to foreign-built cars, compelled the industry to concentrate on the manufacture of small cars. But the change, despite the perennial warnings, came too late to permit the automobile industry to hold its own. It is estimated that the industry, America's largest, will lose $4 billion in 1980, while the Chrysler Corporation has become a ward of the government. Thus far the industry has laid off 300,000 employees. Over 1400 auto dealerships have closed.[4] Now President Jimmy Carter has committed himself to a program to bail out, at public expense, an industry whose profits for many years were astronomical.

One wonders, as did Barbara Tuchman recently, why governments generally perform less well than other human institutions. Common sense and available knowledge should, in most cases, suggest a proper course of national action. Yet intelligent people in government, all college or university graduates, repeatedly make decisions that defy the nation's and even their own self-interest. Why would American commanders in the Philippines leave the planes lined up on the ground after they learned of the attack on Pearl Harbor? Why would the best and the brightest around President Lyndon Johnson lead the United States into a war in Vietnam against the advice of many who predicted accurately why everything would go wrong? Why does the government not adopt policies that would control the ruinous inflation and reduce the wasteful use of energy? Why would the government refuse to acknowledge the opposition to the Shah of Iran? Why would United States officials insist for twenty years that the exiled government on Taiwan was the government of China? Why does a government have so much difficulty in applying the lessons of experience? The capacity of government to be wrongheaded seemed to have no limit. Most philosophers of history did not bother themselves with political folly, yet it has generally been present. The seventeenth-century Swedish statesman, Axel Oxenstierna, commented: "Know, my son, with how little wisdom the world is governed." Woodrow Wilson warned similarly: "In public affairs, stupidity is more dangerous than knavery."[5]

Stupidity exists in all governments, yet democracy has always assumed the superiority of decisions made democratically because they rest, at least in theory, on the combined wisdom and morality of the people. And a citizenry improved directly or indirectly by an expensive educational system should somehow underwrite increasingly intelligent governmental policies. Unfortunately the rise of the present educational structure in this country has coincided with a decline in the functioning of the system until today the government cannot touch those issues that most concern the welfare of its citizens. Fundamentally the colleges and universities have been unable to create any body of knowledge, assumptions about society, or visions of the future that will bring some sense of unity and purpose to the American people.

Certainly the new educational effort has done little for American politics, and if education cannot improve the political process it is not clear that it can advance the performance of American society at all. The level of political campaigning, and with it the decline of voter turn-out, has gone down steadily as the cost and size of the nation's educational structure has skyrocketed. Now, in 1980, politics has entered a netherworld. Lewis H. Lapham, writing in the October, 1980, issue of *Harper's*, described the depths to which American politics has sunk: "Toward the end of the twentieth century, in a country

that prides itself on its faith in reason and the wonders of its science, candidates for the presidency wander for months and years through the ballrooms of Holiday Inns, answering, in twenty words or less, questions that cannot be answered in 100,000 words, smiling steadfastly into the lens of the camera that never sleeps, and displaying, in the manner of surgeons and generals, not the least sign of fear or disgust."[6] Thomas Winship, the editor of the *Boston Globe*, observed recently: "I've never seen such Ping-Pong politics in my life. The level of debate is so thin, nobody can write more than a two-paragraph story." As a result, the political cartoonists are having a field day. "Remember!" Herblock of *The Washington Post* admonished. "A vote for Carter or Reagan is a vote for Carter or Reagan."[7] To reveal their total disenchantment most cartoonists this year have pilloried both leading candidates. Clearly there is something wrong. Either the American educational system is misdirected or it is irrelevant to the functioning of a democratic order.

III

If the Founding Fathers, that remarkable assemblage of men, did not experience much formal education, they managed, despite their quarrels and flaws, to set the country on a successful course. What those men possessed was a rare combination of courage, high principles, a pragmatic disposition, a remarkable knowledge of ancient and modern political thought, and a conviction that there was some relationship between intelligence and human progress. One might list many reasons for their remarkable rationality and high performance—learning, opportunity, social mobility, experience—but such conditions were unique only in terms of the specific status of society in the late eighteenth century. If the formal education of the Founding Fathers was limited, their writings comprise a notable body of political thought. They understood the elements of proper political performance. All their knowledge is readily available to us as educators and much more besides. We might have exposed all our leaders, political and economic, to such thoughts and to such human standards. Somehow we have not done so. There are no Thomas Jeffersons or James Madisons in our midst. Perhaps we have long entered a condition in which society has become so complex that it rules out a close relationship between individual and public performance.

Never in history have individuals achieved such amazing levels of competence as they have in the past generation. In almost every field of endeavor—literature, music, science, art, and sports—achievement has at times been phenomenal. Perhaps in some areas of personal accomplishment we have occasionally sacrificed quality for quantity, but even that is not certain. By contrast, it is difficult to find outstanding performance in public life—a consistency of thought that reflects deep learning or conviction. Nobel Laureate Isaac Singer has stated with considerable truth that if God has been frugal in bestowing intelligence He has been lavish in the distribution of passions and emotions—greed, ambition, fear, vanity, and the desire to dominate.[8] In the United States we combine all of these attitudes into a single phrase—Potomac fever. Such emotions, rather than learning and wisdom, seem to govern much of American society, and the educational system somehow has been unable to eliminate such driving forces from public life.

At one time education sought to create a capacity for critical thinking, moral discernment, and esthetic discrimination. Such human qualities marked the educated person. It is not always easy for those in medicine, law, and the sciences to detect the moral and ethical implications of what they are doing. If scholars engaged in laboratory research have neither the time nor the need to concern themselves with the country's non-scientific progress, they are not immune from the economic and social consequences of society's ills. Indeed, countless scientists, both inside and outside the classroom, reveal a profound concern for the future of American and world civilization. On balance, the humanities have done little better than the sciences in confronting the nation's political and social disabilities. There has been a notable decline of interest in the humanities, in foreign languages, and even in proper English usage. In 1978 fewer than 20 percent of American undergraduate degrees were awarded in the humanities. In part the problem for the humanities lies in the demands of a technological civilization which places a premium on specialized knowledge and skills. Modern society, in the words of Henry Adams, has witnessed the triumph of the dynamo over the Virgin. Obviously salable skills have contributed in many ways to the general well-being of the American people. But if there is no place in American business for those with a humanistic education, then such an education for most citizens becomes an unaffordable luxury.

Unfortunately, the decline of the humanities reflects as well changes within the humanities themselves. Too few academic humanists are concerned any longer with the task of injecting general concepts of morality, honesty, and clear-thinking into the bloodstream of American education. They too are caught up in specialized research and have neither the time nor the inclination to bridge the gap between humanistic and scientific learning, between humanistic thought and social progress. Much of the educational effort is so overspecialized that it succeeds only in preparing the best students for graduate study. There is much in Western culture that can teach ways of proper thinking and behavior. What better way is there to impart values than by studying the characters of history and literature, to analyze their moral dilemmas and understand the choices which they made?

Too much of American education concerns itself with the management of the country's many political, business, and social institutions; it de-emphasizes human experience in favor of scientific methods for improving the performance of society. What encourages the country's special faith in technological, scientific, and administrative solutions to national problems is its unique cultural history. From the beginning the nation confronted no dangerous enemies or overwhelming, inescapable domestic conflicts, but rather a vast, rich continent, uninhabited except for its tiny native minority. In such an environment the chief barrier to progress and

achievement was nature itself. Thus the country never seemed to face problems whose solutions lay outside the proper application of technology—no invasions, no major plagues, no famines, and few wars to require other than managerial answers to the country's needs. In short, there was little in the American experience that encouraged an emphasis on the infirmities of human society, the need for concern, sympathy, morality, or ethics. If cheating and robbing were commonplace, there was still enough left for all. This explains why the public has accepted organized power in American society and the special benefits that those in power derive from the national effort. The benefits, whatever their magnitude, are always specific, whereas the costs to society are so widely distributed that often they comprise no burden at all. If the chief goals of most Americans remain convenience, comfort, and tranquility, it is not strange that they prefer the prevailing tendencies in the national life to costly forms of social and economic restraint.

Finally the problem of American higher education lies in the smorgasbord approach to education—too much sampling without the probability of building a critical mass of learning in even one discipline. At Oxford University the students read generally for three years in only one subject, unless it be the popular PPE—philosophy, politics, and economics. To me, accustomed to the American method of education, one field seemed too narrow. Upon reflection after a year at Oxford, I concluded that if American university students could concentrate on three subjects in their four years—say politics, French, and biology—and had 40 semester hours in each, they would emerge from the experience as highly educated people.[9] This assumes, of course, that the standards of teaching and learning remain high enough to achieve the possibilities of such an experience.

IV

In the social sciences there has been some reduction in the influence of history as opposed to sociology and various forms of political science. Perhaps the growing interest in these applied fields has been the emphasis on institutions, a tendency encouraged by the growth of bureaucracy and complexity in American life. Unfortunately, society is not governed by institutions; it is governed by character. If the institutions of the country have been well established through time, their character is still fluid. There has long been a tendency to view America as something new on the world scene, a country whose energy and innovation would eliminate the need of knowing the past.[10] Yet the very notion that the past is useless for any people seems ridiculous, if not dangerous. Understanding that every historical episode is in some measure unique, the historian must shun false analogies even while recognizing the validity of Montaigne's words: "As no event and no shape is entirely like another, so also there is none entirely different from another . . . If there were no similarity in our faces, we could not distinguish man from beast; if there were no dissimilarity, we could not distinguish one man from another. All things hold together by some similarity; every example is halting, and the comparison that is derived from experience is always defective and imperfect. And yet one links up the comparisons at some corner."[11] Perhaps in no areas of human endeavor does history offer surer guides to action than in diplomacy and war.

Diplomacy is an intensely human activity and its study should require observations on the human qualities of good diplomacy, including the essential understanding and competence of such Americans as Benjamin Franklin, John and John Quincy Adams, Daniel Webster, and William H. Seward—perhaps the most proficient of the country's early diplomatists. No book leads to a better understanding of diplomacy and its limits than does Francois de Callieres's *On the Manner of Negotiating Among Sovereigns* (1716). Callieres emphasized the need of high intelligence, good preparation, forthrightness and honesty, the necessity of compromise, and the role of good human relations in the successful conduct of diplomacy. Yet I wonder how many teachers of diplomatic history deal with such factors at all, or note the rules of diplomatic practice proclaimed by Alexander Hamilton in his "Pacificus" and "Americanus" papers or by George Washington in his famed Farewell Address. Such statements on diplomacy are among the best that the world has produced; American leaders can ignore them only at the country's expense.

Military education in the modern world requires a study of technology and its possible uses, but how one can study war better than through the writings of Frederick the Great, Clausewitz, or the elder Moltke is not clear. Moltke once cautioned military leaders that "no plan of operations can look with any certainty beyond the first meeting with the . . . enemy," because it cannot govern "the independent will of the opposing commander." Clausewitz wrote in his noted work, *On War:*

> No other human activity is so continuously or universally bound up with chance . . . Absolute, so-called mathematical factors never find a firm basis in military calculations. From the very start there is an interplay of possibilities, probabilities, good luck and bad that weaves its way throughout the length and breadth of the tapestry. In the whole range of human activities, war most closely resembles a game of cards.[12]

Military leaders require historical imagination as well as good management. History teems with the failing efforts of generals to manipulate superior resources into combinations that would produce military triumphs. Battlefield situations are not always susceptible to technological or administrative solutions. War, like diplomacy, is human, and what makes the writings of Clausewitz perennially attractive and sensible is war's intensely human quality. Times change, of course, but the choices that confront leaders in any crisis remain limited and persistent, and the best education may not lie in the record of the last conflict. The understanding of war lies more in history than in electrical engineering, parade manuals, and military tactics—important as all of these might be. As Clausewitz phrased it, "historical examples . . . provide the best kind of proof in the empirical sciences. This is particularly true in the art of

war." The history of war is the history of accidents—the winds destroyed the Spanish Armada, the cold which destroyed Napoleon's army in Russia, the disobeyed orders that produced Wellington's victory at Waterloo or the Union victory at Missionary Ridge, the famine which brought down the German army in 1918.

V

Today the academic profession, no less than the legal and medical professions, is under fire. Here the charge is not profiteering or malpractice but simply incompetence, indifference, or the misdirection of effort. What seems to be lacking in all the professions is a true professional spirit which places high among its objectives its service to humanity. Bernard Shaw once charged that "Every profession is a conspiracy against the laity." This was, fortunately, an overstatement, but the measure of truth in it is still too persuading to be ignored. There is no conspiracy of professors against the public, but there is a lack of concern for the needs of society and the precise contribution which any field of academic endeavor can contribute to the benefit of mankind—the understanding of diplomacy and war and the functioning of a huge, capitalistic, economic system; a concern for the underprivileged and the performance of government; the promotion of useful technology to the exclusion of that which conveys predictable, long-term dangers or which is designed merely to extend the unemployment lists. Complexity has not produced a happier or more promising society. More than fifty years ago the social critic and scholar, Joseph Wood Krutch, noted that the predictable achievements in science did not bring a corresponding improvement in the human condition.

> Doubtless this disillusion [he wrote] is due in part to . . . the assumption that we shall be wise and happy in proportion to the ingenuity of the machinery which surrounds us, and it is still the very foundation stone in the faith of the more naive of contemporary materialists who assume that we have, for example, indubitably bettered ourselves when we have learned, first to say things over wires, and then to dispense even with them. A wider and wider experience with inventions has, however, convinced the more thoughtful that a man is not, as once was said, twice as happy when moving at the rate of fifty miles an hour as he would be if he were proceeding at only half that speed, and we no longer believe that the millenium presents merely a problem in engineering. Science has always promised two things not necessarily related—an increase first in our powers, second in our happiness or wisdom, and we have come to realize that it is the first and less important of the two promises which it has kept most abundantly. For Krutch the ultimate value of science lay in its human value; the real limitation to its social contribution lay in the limitations of human nature itself. Science might well fulfill its own promises without in any sense solving the problems of human society.

Any profession requires special training to enable it to achieve a designated purpose. The academic profession, like the others, encompasses tens of thousands of individuals who differ widely from one another. Thus the profession is always unstable. It plays a function which may be eternal, but the profession itself may decline even if the function continues. The academic profession, no more than others, can exist through time as a privileged group unless it fills a recognized need. A profession exists for public use, not as an object of wonder. Traditionally the professions were expected to maintain adequate performance by policing themselves. In the long run, however, professions can be judged only by the practices which the public can see, and if the practices fail to meet what the public demands, the result is external control. "The message for the professions today," Jacques Barzun warned recently, "is that their one hope of survival with anything like their present freedoms is the recovery of mental and moral force. No profession can live and flourish on just one of the two. For its 'practical purpose' it requires the best knowledge and its effective use. But since that purpose is to transfer the good of that knowledge from the possessor to another person, the moral element necessarily comes into play. *Moral* here does not mean merely honest; it refers to the nature of any encounter between two human beings . . . . As soon as a person serves another, ethical issues spring to life and get settled well or badly."[13]

Unfortunately, the larger and more advanced the profession, the less accountable it becomes. For too long the academic profession has pursued its own rather than society's interests. As a result, the time when competition and performance were judged by the narrow interests of the academic community is rapidly passing. The demands for good teaching and socially useful research have increased, with threats to end tenure so that teachers will meet public demands. These requirements, in the future, may well exclude those university functions which contribute little to the intellectural advancement of the students. In the future faculties will be judged on their recognizable contributions to society. And when one begins to place such burdens on the academic profession it soon becomes clear that there is a shortage, not a surplus, of true professionals. Barzun once commented on this phenomenon:

> As a whole every profession is always horribly average, mediocre. By definition it cannot be anything else. But the public expectation aims much higher than mediocrity, so that in a time of reckoning, when the laity is hot about its rights, general dismay and recrimination are inevitable. What is more, although any art should be judged by its best results, a democratic nation, bent on equality in all things, is sure to judge a profession by its worst exemplars. That is the condition we are in now.[14]

The challenge to the professionals will be that of turning those who are not into at least a semblance of the real thing.

Discipline within any profession must be rigorous, otherwise too many will indeed view it as conspiracy against the laity. Beyond policing, there must be a new moral and intellectual leadership which can chart a new vision for the profession and its proper role in society. Leadership does not demand great innovation but merely

the reaffirmation of standards and purposes which all should be able to recognize. There is much important work to be done both in strengthening the academic profession and in making it more useful to society, assigning it a broader purpose so that it can create a more beneficial relationship between academic performance and quality of society as a whole. The times call for greater rather than lesser effort within the academic community to improve the relationship between teaching and research, both in the sciences and in the humanities. The combined effort should enlarge the human capacity to understand the problems of contemporary society and to move the universities more thoughtfully toward the goal of fulfilling the demands which any society should place on its educational institutions. No university professor alone can wield the power or the knowledge to improve human society very much, but each one can discover in his and her discipline those elements that will add something to useful knowledge, moral values, and human possibilities, and thus encourage some advances against the tendencies that lead to ruin and decay. If the universities cannot uplift the quality of the country's thought and engender a broader concern for society's future, it is certain that neither government nor business will do so.

NOTES

[1]This writer has analyzed the growth of education since Sputnik in *The Age of Global Power: The United States Since 1939* (New York, 1979), 159-161.

[2]William Tucker, "The Wreck of the Auto Industry," *Harper's*, 261 (November, 1980), 45-46.

[3]Norman A. Graebner, "The National Purpose," *Parameters*, X (March, 1980), 10.

[4]Tucker, "The Wreck of the Auto Industry," 46.

[5]Barbara Tuchman, "An Inquiry into the Persistence of Unwisdom in Government," *Parameters*, X (March, 1980), 3.

[6]Lewis H. Lapham, "Ordeal by Fire," *Harper's*, 261 (October, 1980), 10; see also Terence Smith in *The New York Times*, September 21, 1980, E3.

[7]*Newsweek*, October 13, 1980, 77.

[8]Quoted in Tuchman, "An Inquiry," 5.

[9]The writer developed this suggestion at length in "Teaching and Learning at Oxford," *British Association for American Studies Newsletter*, No. 41 (January, 1980), 2-3.

[10]John Lukacs, "Obsolete Historians," *Harper's*, 261 (November, 1980), 84.

[11]Quoted in Han J. Morgenthau, *Politics Among Nations* (New York, 1978), 18.

[12]Quoted in Jeffrey Record, "The Fortunes of War," *Harper's*, 260 (April, 1980), 22.

[13]Jacques Barzun, "The Professions Under Siege," *Harper's*, 257 (October, 1978), 68.

[14]*Ibid.*, 65-66.

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Scholarship Through Research

"Science is the product of organized fantasy about the real world, tested by an internal logic of necessity and an external public record of expectations, both real and disappointed."

Kenneth E. Boulding

What is research? We all have our own personal perception of the meaning. Let us, for purposes of a common ground for dialogue, accept Webster's definition: "The careful, systematic, patient study and investigation in some field of knowledge, undertaken to establish facts or principles". It would follow, then, that scholarship and research are mutually compatible entities. Certainly, all members of *academe* engage in the Websterian form of research to one degree or another. Present practicality and common usage has added a terminal clause to the above definition, to wit ". . . resulting in the publication of findings in a refereed journal and the acquisition of funds to support further investigation."

The foregoing presupposes that the research enterprise requires some justification and verification of outcome. Further, it presupposes that it costs money to do research. In order to build upon this, let me limit my remarks to scientific research; more specifically to basic science research. Werner Von Braun is quoted as saying, "Basic research is what I am doing when I don't know what I'm doing." I am for research, I encourage and nurture it for faculty, I require it for graduate students. I submit that our research will change in the coming years. The very flavor of our research activities in the future may be carried out under ever more stringent Federal guidelines and regulations; Will we be able to succeed? Today, over 59 separate Federal laws and regulations affect both the cost and conduct of research. Agencies of the Federal government can threaten and cut off funds if their regulations are not adhered to.

The present time period is critical. A marked change in governmental policy with regard to support of basic research has occurred. This change, while nonpartisan in origin and nature, has resulted from demands by the public, the Legislative and the Executive Branches of Government. These demands revolve around a more rapid solution to pressing social problems such as health care through mission-oriented research. The unrestrained enthusiasm and desire for the eradication of diseases such as cancer and heart disease have not been fully realized. Although the investments have been generous, these diseases have evaded the dedicated efforts of talented and imaginative investigators. I will return to this later.

Let's take an historic view of some research activities. It has often been said that it is difficult to define creativity, but we can certainly recognize it when we see it. The creative individual must have a liberal portion of three attributes: mental capacity, judgement and motivation.

Thomas A. Edison had all three. He used his creative genius to invent and develop many practical items. Whether he was mission-oriented is not known. It is clear that in his later years he accumulated other creative people to come up with practical uses for electricity. It has been said that he wanted an invention a day by his group. Edison is clearly the most creative American of the past century. Albert Einstein published in, the early part of this century, the equation that was to make him famous - $E=mc^2$. Over 30 years later, Hahn and Strassman showed that if the nucleus of a single uranium atom were bombarded by neutrons, the atom would split releasing a tremendous amount of energy. No one had anticipated this when Einstein published his theory. It was suggested to Einstein that the work could be carried further. The neutrons released from the splitting of one uranium atom could bombard other uranium atoms in a chain reaction. This could make possible the creation of a bomb of tremendous power. Einstein was both astonished and appalled. He is said to have uttered,"DARAN HABE ICH NICHT GEDACHT", ("I never thought of that"). How humble! Such an idea was far too practical for Einstein's creative mind.

For the birth of something new, there has to be a happening. Newton observed an apple falling; James Watt watched a kettle boil; Roentgen fogged some photographic plates. These people knew enough to translate the happening into something new. The public has come to think that the successful scientist is one who has a gift for finding the valuable or agreeable in things not sought for. In this regard, while not to disparage the creative genius, many scientific breakthroughs, came by accident - serendipity. In 1929, Alexander Fleming observed the inhibited growth of bacteria by a mould of the genus *penicillium*. He had been working on variations in colonies of staphlococci; work which entailed examining his culture plates with the lids lifted at frequent intervals. During this process a spore drifted onto one of the plates; after standing for about a week at room temperature, a fungus appeared which was noted to be remarkable. The fungus secreted a substance into the broth which had the power to not only stop growth, but to eventually kill many bacteria. Fleming observed that the substance acted on many pathogenic organisms such as streptococcus and staphylococcus, while others were unaffected. For this antibacterial substance Fleming chose the name penicillin. In an article entitled, "Thirty Years of Penicillin Therapy," Ernst Chain, who shared the 1945 Nobel Prize with Fleming and Florey, wrote:

> "I started to work on penicillin in 1938, long before the outbreak of the war. The frequently repeated statement that the work was started as a contribution to the war effort, to find a chemotherapeutic agent suitable for the treatment of infected war wounds, has no basis. The only reason which motivated me to start the work

on penicillin was scientific interest. I very much doubt, in fact, whether I would have been allowed to study this problem at that time in one of the so-called "mission oriented" practically minded industrial laboratories. The research on penicillin, which was started as a problem of purely scientific interest but had consequences of very great practical importance is a good example of how difficult it is to demarcate sharp lines between pure and applied research."

Fleming once said, "It is the lone worker who makes the first advance in a subject but, as the world becomes more complicated, so we are less and less able to carry through anything to a successful conclusion without the collaboration of others."

Research is building upon what has been done before. The solid immunity left by many viruses and the classic observations of Jenner on immunity to smallpox and of Pasteur on immunity to rabies following innoculation with living, attenuated viruses set the fashion for the use of living vaccines in virus diseases which has persisted to the present. There are, however, exceptions.

While looking for an effective culture system for growing viruses, Jonas Salk was able to grow poliomyelitis virus on kidney cells from monkey. It was this source of virus that was used in the preparation of killed vaccines for mass innoculation. Ths subsequent live virus vaccine was brought about by an independent line of research by Albert Sabin and resulted in the isolation of mutant forms of each of the three viruses. These viruses had lost their ability to invade nerve tissue, but not their ability to immunize. The results of mass innoculation were dramatic. Could such discoveries have been accomplished in the present scientific environment?

During the past decade, Congress has enacted: the National Cancer Act, the National Heart, Lung, and Blood Act, the National Diabetes Research and Education Act. It launched specific research programs for cystic fibrosis, sudden infant death syndrome, hemophilia, sickle cell anemia, and other genetic diseases. It created commissions to study possible Federal programs in Huntington's disease, epilepsy, multiple sclerosis and digestive diseases. Recently, through a last minute, midnight resolution, Congress declared war on amyotrophic lateral sclerosis - Lou Gehrig's disease. Is it any wonder Congress is called the disease-of-the-month club?

Let's take a look at a recent classic example of mission-oriented, government-generated research. President Nixon, during his first term in office, established a National Cancer Authority within the National Cancer Institute, officially part of the NIH, but with the direct connection to his office. He proposed to increase the appropriations to this institute by $100,000,000 per year until the annual budget in about ten years would be one billion dollars. In addition, over the years a significant portion of research funds were distributed via the contract system, a dangerous departure from accepted policy. The program was conceived to produce cures for cancer in this period of time. Improved treatments were also conceived as a goal. Why did Nixon embark upon this politically expedient action? It was prompted by the success of the space program. In the early portion of his administration, John Kennedy conceived that we would put a man on the moon by 1970. This was not an unreasonable suggestion since, from the time Marco Polo observed that the Chinese could move a projectile from point A to point B by the use of black powder, continuing through the development of the V-2 rocket, the technology was there to effectively put a man on the moon. By contrast Nixon's plan had a shaky basis. The scientific community did not know how normal cells operate, let alone how abnormal cells function. We have since reached the end of Nixon's imposed ten year cycle to effect a cure for cancer. Again, Congress and general public are impatient since no cure is forthcoming. You've heard it, "If we can build an atom bomb or send a man to the moon, why can't we cure cancer, heart disease, and other hazards to health?" While a perfectly logical question, it fails to make a very fundamental distinction between the nature of technical as contrasted with theoretical problems.

We are seeing a cutback in Federal funding all across the board. A basic problem concerning the present system by which research money is funded, is that it was developed in, and suited to, a period of time when enough funds chased the available talent. This is not the situation presently, as a number of talented scientists are not being funded. Some years back, Nils Bruzelius wrote a concerned article in the *Boston Globe* about the fact that Nobel laureate Albert Szent-Györgyi had not received funding for his most recent applications to the National Cancer Institute. Reasons given for the failure to be funded were based on the maverick scientist's hypothesis concerning the cause of cancer. Some may have blamed these ideas on Szent-Györgyi's advancing age, being 78 years old at the time. However, many supreme court justices and leaders of state, as well as leaders of society, who literally had a direct effect on matters of life, death and law of the land were just as old. Szent-Györgyi argued that the criteria of review groups tended to limit the progress of basic research by constraining it to the smallest, mincing steps beyond existing knowledge. "Worst," he says, "they foster intellectual dishonesty among some researchers by forcing them to warp their own thinking to fit the requirements of a grant application."

It seems to many scientists today that problems exist in both the basis for funding and the way a scientist is being evaluated, i.e., the peer review system. There have been criticisms of the peer review system. In the present funding situation the uncertainty of being funded is far too high. This, coupled with the boom and bust cycles often called the "faucet phenomenon" (either off or on), is a situation which is not conducive to building a stable research operation. Scientists who have had a proven background of productivity should be funded if their research activities are sound.

The philosopher George Santayana has written, "Wisdom comes from disillusionment." If Santayana observed correctly, scientists are much wiser today than they were ten years ago. Kenneth E. Boulding has observed that, "Science occupies a socioecological niche, the boundaries of which are very largely determined by

the image of science in the minds of non-scientists, especially those who make decisions about budgets . . . If the image changes, the niche begins to close." The action of these decision makers reflect, to a degree at least, the feelings of the general public. The people's concern over new scientific endeavors has now spilled over into the public realm. This became most pronounced when the Cambridge (Massachusetts) City Council switched its interests from parking meter problems to that of recombinant DNA experiments at Harvard and MIT. Perhaps we have failed to recognize that as members of the academic community it is our responsibility to articulate not only the content, but the process of our research. We must not emulate Fontanelle, who remarked to the audience listening to his discourse on the laws of the universe in 1686, "Let us content ourselves with being a select little band and not disclose our mysteries to the people." It is the common view that scientists are the experts who discover and provide information to each other and the general public.

Recently, psychologist Robert A. Baron related his feelings upon having received the "Golden Fleece Award" from Senator William Proxmire for investigating the effects of heat on human aggression; a small portion of a much larger study. Professor Baron says, "As I've thought about this issue over the years, it becomes very clear to me that often as scientists we are guilty of not communicating with our friends and neighbors, with the general public, with the people whose tax dollars support our research. If we're going to get public support for research, we have an obligation to do this as clearly and crisply as possible." Professor Baron continues, "Don't take public support for granted. Be prepared for criticism and close the communication gap between science and the general public or face the consequences."

We measure the public's learning and acceptance of science by the funds appropriated for its support. Another way of looking at this is to distinguish between understanding and information. Understanding elicits responsiveness, whereas, information alone may elicit confusion. Emphasis on the facts of discovery as related in newspapers, radio, and television may be counterproductive. Which of several reports does one believe? Do large doses of vitamin C prevent colds? Does vitamin C prevent cancer? Does saccharin cause cancer? What is a safe dose of radiation? Is nuclear energy safe? Should we cease to eat eggs and dairy products because of the potential danger of atherosclerosis? The public cannot be expected to fit daily packages of new and sensational discoveries into sensible patterns of knowledge. It is for this reason that people turn to fads and mysticism. Several years ago, a tabulation of replies from over 8,000 readers of the *Sunday Times* of London showed that although the people assigned a high value to science, only 15% were prepared to rely upon it as their principal means of knowing. In addition, 42% thought that communication with the dead was fair possibility; 9%, a certainty. Over 25% thought telepathy was an established fact; 47% though it likely; and only 1.5% rejected it completely. Seventy-five percent thought that there was at least some truth in astrology. Nearly half believed in ghosts. Of these respondents, half were professionally employed and 42% were college educated.

A scientific community has a responsibility to sift and organize facts into rational patterns so that the public can comprehend them. It is understanding that encourages critical thought and resourcefulness. It is understanding that has been overlooked, all too often in our public information program related to science. It is well to recall, as Rene DuBos stated in his book *So Human An Animal*, "The ability to choose among ideas and possible courses of action may be the most important of human attributes." The future of research in all areas rests ultimately in the hands of a supportive general public. If we are not careful, it is possible that the priorities given to science by the general public and the willingness of the public to support scientific research will be decided by subjective reason and political expedience. It is necessary, therefore, that while we improve our efforts to persuade the public of the importance of the support of research, that we also emphasize and encourage an understanding of the process of discovery. The public's conception of the act of scientific discovery is often tempered by stereotypes. Recall this scene: Paul Muni in the title role of the 1935 film *The Story of Louis Pasteur* who, while burning the midnight oil in his laboratory, has the sudden inspiration to take some bottles from the shelf, mix their contents and thus discovered the vaccine for rabies.

Let me close with this quote, as true today as it was over a half century ago.

> ". . . not only will men of science have to grapple with the sciences which deal with man, but . . . and this is a far more difficult matter . . . they will have to persuade the world to listen to what they have discovered. If they cannot succeed in this difficult enterprise, man will destroy himself by his halfway cleverness."
>
> Bertrand Russell

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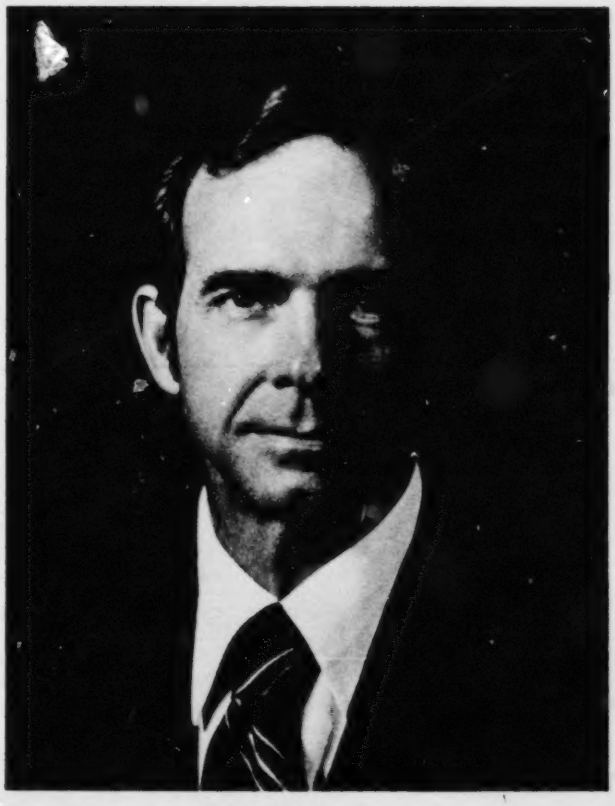

Scholarship

I would like to address today the general subject of the impact of scholarship on land-grant universities. In particular I want to share with you a few observations related to opportunities for scholarship in the 1980's.

The term scholarship used in its broadest sense is the essence of the teaching/learning process — the pursuit of knowledge. This essence is not a simple substance but rather a complex of varying ingredients. For the present, however, I am taking a narrower frame of reference on scholarship for which the term research is more accurate. Research may not be an essential component of scholarship, and research certainly is not an essential component of teaching. However, I am convinced that the teaching/learning process acquires a special flavor in the presence of active ongoing research. The cutting edge characteristic of scholarship, or as the more contemporary jargon would phrase it, "the essence of now" is more readily transmitted to students when they are exposed to a faculty member's own research. Likewise this setting is more likely to produce that rare but highly desirable active response from students, the pursuit of knowledge, rather than their more usual passive response to being pursued by knowledge.

The land-grant university in the present context refers more to a philosophical concept than to a funding pattern derived from the Morrill Act and related subsequent legislation. The emphasis of this discussion will be on mission oriented universities with a strong emphasis on science and technology including agriculture and life sciences. Much of what I have to say will apply to all research oriented universities.

Because of the limiting effect of my background in the sciences, I shall give special emphasis to the role of science and technology in this presentation. However, let me state initially that I am more strongly persuaded than ever that a strong liberal arts program provides the glue that holds land-grant universities together — making them universities rather than multiversities of separate professional schools. I shall return to this theme later in these remarks.

The expansion of land-grant colleges, along with the expansion and development of this country, coincided with the first major growth of science and technology in the western world. The colleges fed on this process and at the same time literally fed the process. The mutual success, beyond belief, of both systems was not coincidental. This early expansion phase was the first of three periods of almost revolutionary development related to land-grant universities.

As the system grew the distinction between land-grant colleges and the so-called major universities began to diminish as the colleges became larger and more comprehensive. This early change resulted primarily from an expansion in the land-grant system, with the development of more comprehensive and more sophisticated programs of research.

The second major revolution coincided with the revolution in science and technology that followed the launching of the first Sputnik on October 4, 1957. Once the implications and significance of Sputnik I became apparent, the resulting national panic was so dramatic that all of the major research universities and many minor ones were caught up in a massive scientific build up that threatened to overwhelm the entire system. During that period of explosive growth in the American scientific enterprise, the last of the land-grant colleges became land-grant universities; and with the massive federal funding of both public and private higher education, the distinction between the various categories of research universities was further diminished. The growing age of science in particular broadened into the "age of the egghead" in general. Dr. Nathan Pusey, speaking at the Johns Hopkins commencement in 1957, predicted this in saying: "For we live in a time of such rapid change and growth in knowledge that only he who is in a fundamental sense a scholar — that is, a person who continues to learn and inquire — can hope to keep pace, let alone play the role of guide. Indeed it is not too much to believe that we may now be coming into an Age of the Scholar, for we have created for ourselves a manner of living in America in which a little learning can no longer serve our needs."

The sense of national unity that usually accompanies a serious external threat removed many of the barriers to rapid expansion and extensive federal funding for the academic enterprise, and further reinforced the move toward uniformity. In retrospect it seems ironical that during the so-called golden years, when scholars and scholarship achieved greater recognition and public esteem than at any time in history, the land-grant movement came closest to losing its identity and abandoning its original mission.

During this period of unprecedented expansion, the mission of land-grant universities along with that of most research universities was broadened to the point of becoming almost all encompassing. The prevailing attitude of the day was that all problems were solvable, all ills were curable, and that the mission of the universities should be expanded to include an attack on all these problems and ills. It is perhaps fortunate that this balloon burst in the late 1960's. Let me hasten to emphasize that when the balloon burst, the explosion involved primarily two myths that were interrelated: (1) the concept that our horizons are limitless; and (2) that universities following the limitless horizons philosophy could and should be all things to all people. Fortunate also is the obvious fact that the bursting of this balloon did not rip apart the educational establishment. It did, however, get our attention. It also led to a period of disillusionment on the part of many young research oriented Ph.D.'s freshly trained to step into opportunities unlimited only to find that the holder of a Ph.D. was as inscribed on our coins, E. Pluribus Unum; but opportunities to use that Ph.D. to acquire money bearing that inscription were increasingly limited.

A decade has now passed since the balloon burst, and much of the dust has settled. During this period in-

stitutions have sought to refocus their major priorities and have done at least some coarse tuning on the nature and limits of their mission. In most instances this has led to a narrowing of the total scope of the institution, a process that is continuing today.

As a result of this focusing and tuning it is also apparent that most land-grant universities have moved back in the direction of their original mission and philosophy — giving research and service emphasis to solving problems that are of immediate concern to the people, and through these research and extension efforts providing a strong stimulus and undergirding for the business, industry, and agriculture of the state and nation. It is also interesting to note that the major research thrusts of many other institutions have also moved in this direction. It is not just the land-grant universities that are wrestling with the problems and opportunities of the new coalition between business, industry, and universities.

With all of its disillusionment the past decade cannot be characterized accurately as a period of retrenchment but rather as a period during which universities have assimilated some of the effects of the previous revolution and have established a new position which I view as a high plateau with a definite upward slope. It is well that we have had time to reevaluate our position because we are clearly moving into the third period of revolutionary change with the emergence of a technological society that will be massive in its effect and global in its scope. From our present high plateau, I am confident that institutions with strong research programs in science and technology will be able to respond boldly and vigorously to the enormous challenges and opportunities of the present decade. Rather than feeling discouraged over the prospects of the awful 80's as many forecasters have pictured the next decade, I am confident that the stage is set for the greatest opportunities we have ever known. I believe this is particularly true for land-grant universities.

The major crises that face the world today are centered around problems related to food, energy, environment, and water. Research in the many disciplines that focus on these areas are the traditional strength of our land-grant universities. The age of high technology, which has become almost a trite expression, will inevitably emerge during the present decade. This is already leading to an explosion in research efforts in the areas of microstructural science including electrical engineering, computer science, solid state physics, surface chemistry, materials engineering, and many other related disciplines. These are areas of growing strength in most land-grant universities.

Projections and forecasts of the potential impact of microelectronic developments on our civilization are mind-boggling. Many predict that new technologies based on this science will be of greater significance in shaping our economy and influencing the way we work and live than any other single development since the industrial revolution. Some even refer to this development as a second industrial revolution and predict that from research and technological development in this area will come solutions to many of our most pressing problems. (Note that we are now projecting solutions to many but not all of our problems.)

Even the more conservative forecasters refer to the impact of these new technologies in terms of explosive growth, radical and sweeping changes, enormous capabilities, and other such extravagant phrases. The age of microelectronics came about as one of the major spin-offs of the space age build up of the 1960's. The major spin-offs of the new age of microelectronics are exciting and almost frightening to contemplate. For major research universities, however, the opportunities and prospects should be exciting indeed.

Iredell Jenkins, former head of the Philosophy Department at the University of Alabama, recently spent a semester at North Carolina State University helping us with a study of our core curriculum. In a speech at the end of this study he used a theme from Shakespeare's Twelfth Night, ". . . some are born great, some achieve greatness, and some have greatness thrust upon them." He suggested that those institutions that have achieved a measure of greatness in the fields of science and technology are about to have greatness thrust upon them.

As we enter the decade of the 80's and the third period of revolutionary change, the fortuitous combination of problems and opportunities has set the stage for this event. But if this is to occur, if a level of unfamiliar greatness is to be thrust upon us, we must take immediate and serious note of at least four issues or concerns. These may seem trivial to some but I believe they are of significance.

(1) We must find some way to break the normal time lag in improving the academic reputation of our institutions. The academic reputation of an institution is based almost totally on the scholarship of its faculty. Thus the responsibility for this reputation and the accompanying rewards for a reputation of excellence and strength belong to the faculty — the scholars.

The quality of the student body and the quality, imagination, and vigor of the administration are of minor significance as compared to the impact of the scholarship of the faculty. Unfortunately, there is a tremendous lag phase between the achievement of quality and the general recognition of that quality. Obviously we must enhance the overall scholarship programs of our institutions, but we must also find a dramatic way to overcome the lag phase. I believe this will most likely be accomplished by giving very special care and feeding to one or two programs making them as rapidly as possible competitive with the very best in the country. This can occur spontaneously, but more often careful nourishment is required.

(2) During the period when universities are perhaps narrowing their focus and restricting their total mission, we must be careful to avoid the temptation to become too narrow and lose a quality that comes only with diversity. The line of least resistance and the line of greatest immediate reward may well lead to a technological institute rather than to a comprehensive university. But if greatness is to be thrust upon us our role will not be limited to that of producing scientists and scientific data or technologists and technology. The third revolution I

have described will create a demand for a new quality of leadership for our businesses, industries, and institutions including government. Leadership during the next generation must inevitably emerge from people with a comprehensive understanding of science and technology, its demands, its rewards, and its human implications. For too long a time land-grant universities have graduated the people who have done a great portion of the world's work and who have solved a great number of the world's problems. But a disturbingly large proportion of the top executives, the leaders of our society have come from other kinds of institutions. Happily evidence is already abundant that this is changing, and I predict that this change will become dramatic during the next decade.

If land-grant universities are to assume or earn a greater role in the education of leaders, maintaining the diversity of the institution becomes of even greater significance. Meaningful and rigorous experiences in humanities will become increasingly important. This will be true not only for the mental discipline, the added skills in communication and perception and the socializing influences, but more importantly for the broadened base of sensitivity, for a sharpening of the ability to see problems and issues from multiple frames of reference. Of particular importance will be the development of a comprehensive understanding of the historical and contemporary prevalence of ambiguity in all of human affairs. My experience as a university chancellor leads me to suggest that the tolerance for ambiguity may become one of the prime requisites for leadership responsibility.

The desired sensitivity to the range of human values is not likely to result from a superficial exposure to the humanities, and it certainly will not result from a student's being pursued by the humanities. The kinds of experiences that lead to the levels of sensitivity and perception that I am referring to are more likely to develop through contact with humanists who are themselves actively involved in the pursuit of knowledge.

(3) We have clearly outgrown our traditional symbols and images, and the development and portrayal of an accurate and appropriate contemporary image of our institutions is made incredibly difficult by the old symbols. The lamp of learning never carried with it negative or outdated connotations. But the bib overalls, the one-horse turning plow, the cowbell, the lumberjack, and the slide rule should be replaced — perhaps by the lab jacket, the amino acid analyzer, the gas chromatograph, the electron microscope, the laser, and the computer terminal. Not that we have become elitists and abandoned our original mission and charge — on the contrary the land-grant movement has become so successful that fulfilling now the original charge requires the highest level of sophistication represented more appropriately by the latter symbols.

(4) Scholars and research administrators will have to summon forth during the next decade not only a new level of mental energy to find solutions to the physical, biological, and social problems that confront us, they will also have to summon forth a new level of discipline.

Eric Hoffer, that marvelous self-educated critic of the establishment, in an article entitled "Beware the Intellectual" stated the following: "It is conceivable that if the exhaustion of raw materials and sources of energy make it imperative for a society to tap the creative energies of its people it may in doing so also tap a new source of social discipline, for the creative individual, no matter how highly endowed, must be hardworking and disciplined if he is to accomplish much."

More important than the work ethic discipline referred to by Hoffer will be the kind of discipline required to overcome two other major obstacles that confront us. First, is that many of the problems we must now deal with are large problems that will require major group efforts and cooperative programs. These will extend beyond research groups within a department or between closely related departments or disciplines, and will involve increasingly, cooperative programs between divergent disciplines — interdepartmental, interschool, interuniversity, or international in scope. The aggravations and territorial imperatives that arise from such programs are often as difficult as the research problems themselves! There will be a special demand for those scholars and those research administrators who can rise above the frustrations and aggravations that accompany in abundance these large cooperative programs.

Special rewards should be made available to those who can make it work. As a southern politician once said, "There comes a time when you simply have to rise above your principles."

The second obstacle which is interrelated is the complex of all the minor obstacles, filters, and petty bureaucratic entanglements that scholars and research administrators today must overcome. Indeed, I am not nearly so concerned about our ability to find answers to the major questions and puzzles that lie before us as I am of our ability to overcome somehow all of the petty obstacles and entanglements that sap our physical and mental energy and keep us from doing our daily work. Despite the time, attention, and energy that has been given to reducing or avoiding to these entangling snares in recent months, the problem seems to get worse. The new A-21 regulations for time and effort reporting and the proposed new regulations for disposal of hazardous waste provide two new gordian knots for us to deal with. We must maintain our vigilance and increase our efforts at overcoming these problems, but in the near term there will be a great demand for scholars who can maintain a high level of productivity despite the encumbrances. This will require a special kind of person and a special kind of discipline.

Thus the challenge is before us. The extent to which greatness is thrust upon a particular University will be largely dependent upon the quality of scholarship coming from that university. The crises of the 80's could well be the opportunities of the 80's. I am told the Japanese word for crisis, wei-chi, literally means dangerous opportunity. We do face a tremendous dangerous opportunity!

In Act IV of Shakespeare's Julius Caesar Brutus said, "There is a tide in the affairs of men which taken at the flood leads on to fortune . . . on such a full sea we are now afloat; and we must take the current when it serves, or lose our ventures."